

Application Serial Number 09/991,445

Attorney Docket No. 48175-00005

IN THE CLAIMS

1. (Currently amended) A microbubble for the in vivo transport of physiological gases wherein the microbubble comprises a membrane entrapping at least one fluorocarbon gas and at least one modifier gas, wherein the ratio of the modifier gas to the fluorocarbon gas is from about 1:100 to about 1000:1, wherein the partial pressure of the resulting gas mixture at 37°C is greater than the equilibrium partial pressure of the fluorocarbon gas, and wherein the microbubble grows and shrinks to maintain osmotic equilibrium with the physiological gas saturation of the surrounding external medium.
2. (previously presented) The microbubble of claim 1 wherein the modifier gas saturation level changes in the bubble as the microbubble circulates.
3. (previously presented) The microbubble of claim 1 wherein the surrounding external medium is blood.
4. (previously amended) The microbubble of claim 1 wherein the microbubble comprises the at least one fluorocarbon gas and the at least one modifier gas while in vivo.
5. (previously amended) The microbubble of claim 1 wherein the physiological gas is selected from the group consisting of oxygen, nitrogen, carbon dioxide, and any combination thereof.
6. (previously amended) The microbubble of claim 1 wherein the microbubble grows when the at least one modifier gas of the microbubble exchanges with the physiological gas present in the surrounding external medium.
7. (previously presented) The microbubble of claim 6 wherein the physiological gas present in the surrounding external medium is oxygen.
8. (previously presented) The microbubble of claim 6 wherein the physiological gas present in the surrounding external medium is air.

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9. (previously presented) The microbubble of claim 1 wherein the at least one fluorocarbon gas is selected from the group consisting of perfluoropropanes, perfluorobutanes, perfluorocyclobutanes, perfluoropentanes, perfluorocyclopentanes, perfluoromethylcyclopentanes, perfluorohexanes, perfluorocyclohexanes, perfluoromethylcyclopentanes, perfluorodimethylcyclobutanes, perfluoroheptanes, perfluorocycloheptanes, perfluoromethylcyclohexanes, perfluorodimethylcyclopentanes, perfluorotrimethylcyclobutanes, and perfluorotriethylamines, and sulfur hexafluoride.

10. (Currently amended) A microbubble for in vivo delivery of physiological gases to an organism or tissues of an organism wherein the microbubble comprises a membrane entrapping at least one fluorocarbon gas and at least one modifier gas comprising oxygen in a ratio from about 100:1 to about 1:1000, wherein the partial pressure of the resulting gas mixture at 37°C is greater than the equilibrium partial pressure of the fluorocarbon gas, wherein the microbubble grows or shrinks in diameter to maintain osmotic equilibrium with the surrounding external medium.

11. (canceled)

12. (previously presented) The microbubble of claim 10 wherein the microbubble grows in diameter to maintain osmotic equilibrium of oxygen within the microbubble with the oxygen in the surrounding medium.

13. (previously presented) The microbubble of claim 10 wherein the surrounding external medium is blood.

14. (previously amended) The microbubble of claim 10 wherein the at least one fluorocarbon gas is selected from the group consisting of perfluoropropanes, perfluorobutanes, perfluorocyclobutanes, perfluoropentanes, perfluorocyclopentanes, perfluoromethylcyclopentanes, perfluorohexanes, perfluorocyclohexanes, perfluoromethylcyclopentanes, perfluorodimethylcyclobutanes, perfluoroheptanes,

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perfluorocycloheptanes, perfluoromethylcyclohexanes, perfluorodimethylcyclopentanes, perfluorotrimethylcyclobutanes, and perfluorotriethylamines, and sulfur hexafluoride.

15. (canceled)

16. (previously amended) The microbubble of claim 10 wherein the fluorocarbon gas is perfluorohexane.

17. (currently amended) A microbubble composition for the in vivo transport of physiological gases wherein the microbubble comprises a membrane entrapping at least one fluorocarbon gas and at least one modifier gas in a ratio from about 100:1 to about 1:1000, wherein the partial pressure of the resulting gas mixture at 37°C is greater than the equilibrium partial pressure of the fluorocarbon gas, wherein the microbubble first shrinks as a result of loss of the modifier gas to the surrounding medium and then grows as the microbubble gains osmotic equilibrium with the physiological gas saturation of the surrounding medium.

18. (previously amended) The microbubble composition of claim 17 wherein the at least one modifier gas is selected from the group consisting of oxygen, nitrogen and carbon dioxide.

19. (previously presented) The microbubble composition of claim 17 wherein the transported physiological gas is oxygen.

20. (previously amended) The microbubble composition of claim 17 wherein the at least one fluorocarbon gas is selected from the group consisting of perfluoropropanes, perfluorobutanes, perfluorocyclobutanes, perfluoropentanes, perfluorocyclopentanes, perfluoromethylcyclopentanes, perfluorohexanes, perfluorocyclohexanes, perfluoromethylcyclopentanes, perfluorodimethylcyclobutanes, perfluoroheptanes, perfluorocycloheptanes, perfluoromethylcyclohexanes, perfluorodimethylcyclopentanes, perfluorotrimethylcyclobutanes, and perfluorotriethylamines, and sulfur hexafluoride.